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In reply refer to:
02EAAZ00-2019-F-1164

May 17, 2019

Mr. Joshua Fife, Biology Team Lead
Arizona Department of Transportation
Environmental Planning
1611 W. Jackson Street
Phoenix, Arizona 85007

RE: Federal Highway Administration (FHWA) File # A89-B(221)T
Arizona Department of Transportation (ADOT) File # 89A CN 375 F0047 01C
Sedona City Limits to Bear Howard Drive Pavement Rehabilitation

Dear Mr. Fife:

Thank you for your request for formal and informal consultation with the U.S. Fish and Wildlife Service (FWS) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. § 1531-1544), as amended (Act). We received your request via electronic mail (email) on January 23, 2019, along with the biological evaluation (BE) for the proposed action, dated January 2019. We received an updated BE by email on February 19, 2019. At issue are effects that may result from a proposed pavement rehabilitation project on State Route (SR) 89A, in Coconino County, Arizona. The proposed action "may affect, and is likely to adversely affect" the threatened narrow-headed gartersnake (*Thamnophis rufipunctatus*) (gartersnake). Below we provide a biological opinion (BO) on effects of the proposed action on the gartersnake.

In your letter, you requested our concurrence that the proposed action "may affect, but is not likely to adversely affect" the threatened Mexican spotted owl (*Strix occidentalis lucida*) (owl) and its designated critical habitat, and proposed gartersnake critical habitat. We concur with your determinations and include our rationales in Appendix A.

In addition, you determined that the action would have "no effect" on the threatened northern Mexican gartersnake (*Thamnophis eques megalops*), western yellow-billed cuckoo (*Coccyzus americanus*), and both species' proposed critical habitat. "No effect" determinations do not require our review and are not addressed further.

This BO is based on information provided in the February 2019, BE for this project, email correspondence, telephone conversations, and field investigations. Literature cited in this BO is not a complete bibliography of all literature available on the species of concern, the effects of

highway infrastructure projects, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office.

Consultation history

January 23, 2019	We received your request for consultation along with the January 2019 BE for the project.
February 19, 2019	We received an updated BE from ADOT with additional gartersnake and owl information along SR 89A provided by the U.S. Forest Service (USFS), Coconino National Forest (CNF).
May 14, 2019	We received an email from ADOT requesting that rockfall mitigation work along SR 89A, originally included as part of the proposed action, be removed from the scope of work. As a result, we are only considering the effects of the proposed pavement rehabilitation.
May 16, 2019	We sent ADOT the draft BO.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The following summary of the proposed action is taken from the February 2019, BE. Maps, photographs, and diagrams related to the action are included in the BE and are incorporated herein by reference. Two maps from the BE are included in Appendix A (Figures 1 and 2).

FHWA and ADOT are planning a Federal-aid project, the Sedona City Limits to Bear Howard Drive Pavement Rehabilitation Project. The project will occur along SR 89A in Oak Creek Canyon, a river gorge extending 15.5 miles (mi) north from Sedona. Within Oak Creek Canyon, SR 89A is a paved, two-lane, undivided highway, with one lane in each direction. Both lanes are 12 feet (ft) wide with unpaved shoulders of variable widths. Unpaved and paved turnouts and recovery zones (defined below) occur on both sides of the roadway.

Most lands on both sides of SR 89A are administered by CNF; however, some state lands and privately-owned lands also occur in the canyon (Figure 1). ADOT operates and maintains SR 89A under a right-of-way (ROW) easement with CNF and easements with private landowners. The ROW along SR 89A extends 66 ft laterally from the highway's center line, for a total width of 132 ft. All project activities will occur within ADOT's ROW easement.

Definitions

Recovery zones, also called clear zones, are obstacle free, traversable areas adjacent to Arizona roadways where vehicles that leave the road have the opportunity to recover and return safely to the road or come to a safe stop. The width of recovery zones varies, but usually extend no more than 30 ft from the edge stripes of the roadway.

We use the term *construction footprint* to include all areas within the affected environment where permanent and temporary surface disturbances will occur. The construction footprint for this project will include 12.1 mi of SR 89A's roadway, shoulders, vehicle turnouts, and recovery zones where pavement rehabilitation will occur, from milepost (MP) 374.5 north to MP 386.6. In total, the construction footprint will encompass approximately 200 acres (ac) of Oak Creek Canyon.

We use the term *action area* to describe all areas of the environment that may be affected by the project, extending out from and including the construction footprint. Typically, the action area is the total area included in our effects analysis; however, the term also has a statutory definition that we provide below.

Scope of Work

The purpose of the pavement rehabilitation project is to extend the life of the pavement along SR 89A and to improve the ride and safety of the existing roadway. The scope of work includes:

- Milling and replacing three inches of asphaltic concrete (AC) pavement for the full width of the roadway, and applying a fog coat and blotter material;

- Milling and replacing two inches of AC pavement on paved turnouts within ADOT's right-of-way (ROW) easement;
- Placing four inches of AC pavement on unpaved turnouts within ADOT's ROW easement;
- Removing and replacing existing guardrail;
- Upgrading Americans with Disabilities Act pedestrian features;
- Placing safety handrail;
- Installing a traffic counter system;
- Installing new delineators, pavement marking, and rumble strips;
- Building up roadway shoulders with native/natural gravel materials indigenous to the area;
- Seeding soils disturbed by construction;

Tree Removal

The contractor will remove approximately 1,762 trees with trunk diameters ≤4 inches from ADOT's ROW easement to permit highway shoulders to be upgraded, vehicle pullouts to be paved or resurfaced, and to clear recovery zones of obstacles on both sides of the roadway. Tree removal is a routine maintenance activity and will involve primarily trees that have grown since the last routine clearing of vegetation from the ROW. The contractor will remove woody vegetation by hand with chainsaws or with a mulching machine that removes and chips trees simultaneously. The contractor will spread mulch resulting from vegetation treatments within the construction footprint, or it will become the contractor's property and hauled off site.

Milling and Paving

Work crews will use pavement milling and paving machines to resurface the existing roadway and to pave or re-pave vehicle turnouts. Crews will use a mobile materials processing plant that mixes asphalt and Portland cement for the paving process. The plant will be moved from one pullout to another as work progresses. Construction activities will occur during daytime and nighttime hours. Work at night will involve the use of industrial lighting at work areas and the materials processing plant.

Project Schedule

ADOT tentatively scheduled the pavement rehabilitation work to occur between September 2019 and January 2020, and it is expected to take approximately five months to complete. However, repaving of SR 89A may begin as early as August 2019 and end as late as June 2020, depending on funding and ADOT project priorities.

Conservation Measures

Conservation measures include those specific to the gartersnake and general measures to control the spread of noxious weeds, minimize the effects of herbicide use, avoid negative effects to soils and water quality, and rehabilitate disturbed areas after construction.

General Measures

- A Storm Water Pollution Prevention Plan and Spill Prevention and Pollution Prevention Plan will be prepared prior to construction to assure that the proposed action will not adversely affect soils or water quality.
- All disturbed soils not paved that will not be landscaped or otherwise permanently stabilized by construction will be seeded using species native to the project vicinity.
- The seed mix will be developed and submitted to CNF for comments and approval.

Invasive Species Control

- Prior to the start of ground-disturbing activities and during construction, the contractor shall arrange for and perform the control of noxious and invasive plant species in the project area. Control measures shall be outlined in a Noxious and Invasive Plant Species Treatment and Control Plan.
- Plants to be controlled shall include those listed in state and federal noxious weed and invasive species lists.
- The plan and associated treatments shall include all areas within ADOT's ROW and easements.
- To prevent invasive plant species from entering or leaving the construction footprint, all vehicles and milling, paving, and excavating equipment will be inspected and cleaned to assure they are free of all attached plant/vegetation material and soil/mud debris before entering or leaving the construction footprint.

Herbicide Treatments

- Control of noxious and invasive plants will occur prior to any ground disturbing activities, and applicators will follow the FWS's general protection measures outlined by White (2007). No herbicides with a toxicity rating over 0 for small avian species, reptiles, and amphibians will be used.
- The contractor will follow all herbicide label requirements.
- The contractor will only use herbicides labeled for use to the edges of water bodies (i.e., imazapyr) and only within recommended buffer zones. Glyphosate will not be used.
- The contractor will not perform broadcast applications of broad-spectrum herbicides within the action area.
- During application of imazapyr (aquatic), the contractor will establish a buffer zone of 30 ft between the area of application and Oak Creek for spot applications, 350 ft for mechanized ground applications, and 300 ft for mechanized ground applications when a steady wind of at least 3 mph is blowing away from the body of water. Within the action area, this applies to areas extending one mi upstream in any contributing channel, tributary, or spring run, and 300 ft downstream of any listed species habitat.
- Within 200 ft of Oak Creek, the contractor will apply herbicides using hand-wand backpack equipment using liquid streams or relatively coarse sprays to minimize spray drift.
- The contractor will use the lowest pressure, largest droplet size, and the largest volume of water permitted by the label during herbicide applications.

Narrow-headed Gartersnake

- No construction or ground-disturbing activities shall begin until a qualified biologist has presented a gartersnake awareness program to all personnel that will be on site, including but not limited to contactors, contractor's employees, supervisors, inspectors, and subcontractors working in the construction footprint. The program will contain, at a minimum, gartersnake identification, biology, distribution, legal status, occurrence in the action area, and procedures to follow if gartersnake encounters occur (see *Terms and Conditions*, page 15). Prior to implementation, the FWS will review the program.
- During tree removal in recovery zones, work crews will avoid the creation of woody debris piles and will not leave such piles in place (e.g., overnight) to reduce the possibility of harassing, injuring, or killing gartersnakes that might seek shelter in the piles.

Action Area

We define the action area as all areas to be affected directly or indirectly by the proposed action, and not merely the immediate area involved in the action (50 FR § 402.02). In delineating the action area, we evaluated the farthest reaching physical, chemical, and biotic effects of the action on the environment, focusing on, but not exclusive to, the SR 89A roadway in Oak Creek Canyon.

The action area for this project includes ADOT's ROW along the 12.1-mi-long (200-ac) construction footprint (from MP 374.5 to MP 386.6), which includes areas immediately adjacent to the pavement, including shoulders, recovery zones, and turnouts, plus the area extending out from the ROW, approximately 100-200 ft in width where construction-related disturbances can occur.

STATUS OF THE SPECIES

Narrow-Headed Gartersnake

This section briefly summarizes the gartersnake's legal status, physical description, life history, population trends, and threats. For more detailed gartersnake information, please review the final listing rule (79 FR 3867).

Legal Status

We listed the gartersnake as threatened on July 8, 2014 (79 FR 3867), and proposed critical habitat on July 10, 2013 (78 FR 41550).

Physical Description

The gartersnake is a small to medium-sized snake with a maximum total length of 44 inches (Painter and Hibbitts 1996). Its eyes are set high on its unusually elongated head that narrows to the snout; and it lacks striping on the dorsum (top) and sides, which distinguishes its appearance from other gartersnakes with which it could co-occur (Rosen and Schwalbe 1988).

Habitat and Natural History

This gartersnake is widely considered one of the most aquatic (Drummond and Macias Garcia 1983, Rossman et al. 1996). It is strongly associated with clear, rocky streams, using predominantly pool and riffle habitat that includes cobbles and boulders (Rosen and Schwalbe 1988, Degenhardt et al. 1996, Rossman et al. 1996, Nowak and Santana-Bendix 2002, Ernst and Ernst 2003).

Terrestrial habitat is also important to gartersnake survival and includes the presence of cobbles, boulders, and bankside shrub vegetation for basking and foraging. The species will use rocks, logs or stumps, and debris jams as cover. Bankside vegetation composed of shrub- and sapling-sized plants such as Arizona alder (*Alnus oblongifolia*), velvet ash (*Fraxinus velutina*), and willows (*Salix spp*) is used for thermoregulation at and near the water's edge. This gartersnake also use terrestrial habitats when dormant (brumating), gestating, to escape floods, and during dispersal.

Nowak (2006) found gartersnakes in Oak Creek Canyon used habitats up to 328 feet from Oak Creek during early fall and spring months, and during summer were strongly associated with boulders in the floodplain. Telemetered gartersnakes brumated under rocks and boulders, in rock piles, on rocky slopes, and on steep rock outcrops and cliff faces up to 656 ft (200 meters) from Oak Creek.

Gartersnakes eat fish (Rosen and Schwalbe 1988, Degenhardt et al. 1996, Rossman et al. 1996, Nowak and Santana-Bendix 2002, Nowak 2006), and are considered specialists in this regard. The species is an underwater ambush hunter that is heavily dependent on visual cues when foraging (de Queiroz 2003, Hibbitts and Fitzgerald 2005); thus, sediment and turbidity levels may negatively affect foraging success.

Sexual maturity in gartersnakes occurs at 2.5 years of age in males and at 2 years of age in females (Degenhardt et al. 1996). Gartersnakes are viviparous and breed annually. Females give birth from late July into early August, perhaps earlier at lower elevations (Rosen and Schwalbe 1988). Longevity may be as long as 10 years in the wild (Rosen and Schwalbe 1988).

Current Distribution and Population Status

The gartersnake occurs across the Mogollon Rim of Arizona and New Mexico, at elevations from approximately 2,300 to 8,000 feet. The species inhabits Petran Montane Conifer Forest, Great Basin Conifer Woodland, Interior Chaparral, and Arizona Upland Sonoran Desertscrub communities (Rosen and Schwalbe 1988, Brennan and Holycross 2006).

Population densities have noticeably declined at many sites across the species' range (Holycross et al. 2006 a, b). Existing sampling data (USFWS files) suggest that perhaps only three populations of gartersnakes are considered relatively dense enough to be somewhat reliably detected: 1) Tularosa River, New Mexico; 2) Middle Fork Gila River, New Mexico; and 3) Oak Creek/West Fork Oak Creek, Arizona.

Threats

The occurrence of harmful nonnative aquatic species such as the northern crayfish (*Orconectes virilis, Procambarus clarki*), numerous species of non-native fish, and to a lesser extent, American bullfrogs (*Lithobates catesbeinanus*), is the primary cause of gartersnake population declines rangewide, and continues to be its most significant threat (Rosen and Schwalbe 1988, Rinne 2004, Minckley and Marsh 2009). These nonnative species prey on gartersnakes and compete for an ever diminishing native fish prey base, ultimately leading to reduced gartersnake recruitment.

Water management actions and developments that reduce stream flows or de-water gartersnake habitat, e.g., dam construction, water diversions, flood-control projects, and groundwater pumping, threaten the gartersnake's physical habitat, and are second only to harmful nonnative species in their negative effects (Ligon et al. 1995; Turner and List 2007, U.S. Geological Survey 2013). Catastrophic wildfires and associated habitat and prey effects (sedimentation, ash flows, fish kills) also threaten the species (Rinne and Neary 1996, Goode and Parker 2015). Other threats include development and recreation within riparian corridors, environmental contaminants, mortality from entanglement hazards such as erosion control products, intentional or unintentional killing of snakes by humans, drought, and climate change (79 FR 38678, Intergovernmental Panel on Climate Change [IPCC] 2007).

Previous Consultations

Federal actions affect the narrow-headed gartersnake every year and require formal section 7 consultation. Since 2014, there have been at least 10 biological opinions that have included the species. A complete list of all formal consultations on the narrow-headed gartersnake is available on request.

ENVIRONMENTAL BASELINE

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area, the anticipated effects of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation, and the effect of State and private actions which are contemporaneous with the consultation process. The environmental baseline defines the status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation.

Description of the Action Area

Oak Creek is a perennial tributary of the Verde River with headwaters that originate below the Mogollon Rim. The creek begins at a natural spring near the Sterling Springs Fish Hatchery (MP 387.9), flows south through Oak Creek Canyon, then southwest through the Verde Valley to its confluence with the Verde River six mi southeast of Cottonwood. Oak Creek can be divided into two distinct reaches: 1) Upper Oak Creek, upstream of Sedona, where the creek flows through a steep-walled canyon with smaller side canyons and tributaries; and 2) Lower Oak Creek, downstream of Sedona, where the creek flows through a wide, fairly level floodplain

(Nowak and Santana-Bendix 2002). The construction footprint and action area fall entirely within Upper Oak Creek.

Oak Creek Canyon varies in width from about 0.8-2.5 mi and in depth from 800-2,000 ft. Elevation of the canyon floor increases from about 4,400 ft at Sedona to 5,930 ft on the plateau above the canyon. SR 89A climbs out of the canyon to the plateau via a series of switchbacks and hair pin turns at the head of the canyon. From there the highway continues north for 16 mi to Flagstaff.

Vegetation in Oak Creek Canyon varies with elevation, transitioning from interior chaparral to Great Basin conifer woodland and Petran montane conifer forest as elevation increases (Brown 1994). Upper slopes above SR 89A are dominated by ponderosa pine (*Pinus ponderosa*) and Douglas-fir (*Pseudotsuga menziesii*). Pine-Gambel oak (*Quercus gambelii*), associations are common on lower slopes, and riparian vegetation along Oak Creek includes Arizona sycamore (*Platanus wrightii*), Arizona alder (*Alnus oblongifolia*), Arizona walnut (*Juglans major*), and velvet ash (*Fraxinus velutina*). Oak Creek's riparian area is heavily used for outdoor recreation including hiking, camping, swimming, and fishing. Four USFS campgrounds and a state park, Slide Rock State Park, occur within the action area.

Status of the Narrow-headed Gartersnake in the Action Area

Oak Creek formerly supported perhaps the most robust Arizona gartersnake population. Oak Creek is also the most well-studied population, with numerous historical records dating back to 1912 that represent over 80 percent of all early Arizona specimens (Holycross et al. 2006 a,b). Survey data from Rosen and Schwalbe (1988), Nowak and Santana-Bendix (2002), Nowak (2006), and Brennan and Rosen (2009) overall reflect a population decline in gartersnakes within Oak Creek Canyon over several decades. Nowak (2006) first demonstrated gartersnake population declines in Oak Creek in 2004-2005, with fewer snakes detected per person-search hour effort in those years compared to detections in the mid- to late-1980s in the same area. Nowak (2017, 2018) showed that detection rates have continued to decline along Oak Creek, e.g., from 0.65 snakes per person-search hour in 1985 to 0.05 snakes per person-search hour in 2018.

Available data indicate that gartersnakes reach their highest densities in the upper-most reach of Oak Creek Canyon, e.g., at the confluence of West Fork Oak Creek, and from there decline along a downstream gradient. The species is rarely detected at Midgely Bridge (Nowak 2006, Brennan and Rosen 2009), and from Sedona downstream to Oak Creek's confluence with the Verde River the gartersnake likely exists at very low densities. Brennan and Rosen (2009) surveyed Oak Creek in 2009, which resulted in the capture of 72 gartersnakes, mostly within Oak Creek's higher reach. However, surveys in 2016 near Sterling Canyon, in the upper reach of Oak Creek, did not detect any gartersnakes (Westeen and Cotton 2016). Recent records near or downstream of Midgely Bridge include one gartersnake near the center of Sedona (Wilcox 2015) and another in the Cathedral Rock vicinity, downstream of Sedona (Berrier 2019).

Factors Affecting the Species in the Action Area

The primary factor affecting gartersnakes in and near the action area is the presence of harmful non-native aquatic species that compete with and prey upon both the gartersnake and its native prey. During AGFD fish sampling in Oak Creek Canyon in 2007, from just upstream of Pine Flat Campground to just above Indian Gardens, non-native fish made up 51.4% of the 1,109 fish caught, with brown trout (*Salmo trutta*) being the most abundant non-native fish in the samples (485 individuals captured, or 43.7% of the total) (Rinker 2007). Non-native rainbow trout (*Oncorhynchus mykiss*) accounted for 7.4% of the catch in Oak Creek Canyon. Speckled dace (*Rhinichthys osculus*) were the most abundant native species, accounting for 39.6% of 1,109 captures. As we mentioned above, other non-native aquatic species that compete with and prey on gartersnakes in Arizona include bullfrogs and crayfish (Rosen and Schwalbe 2002). Bullfrogs occur in the lower reaches of Oak Creek, but not in Oak Creek Canyon (Nowak 2006, 2017). Crayfish occur in Oak Creek Canyon in densities grading from low to high in the downstream direction from Slide Rock State Park (Brennan and Rosen 2009).

Recreation is also a factor that is likely affecting the gartersnake in Oak Creek Canyon. Agyagos (2015) reported on a program called Oak Creek Ambassadors, created in 2013, in which volunteers educate visitors to Oak Creek and remove solid waste in the form of litter. From 2013-2015, encounters with >22,000 visitors were recorded and >12,000 pounds of solid waste was removed. The implications of human use of Oak Creek for gartersnakes include increased risk of injuries and fatalities from vehicle strikes, intentional killing, and effects to habitat, including reduced water quality and alteration and destruction of vegetation.

In 2014, the Slide Fire burned 21,227 acres within the Oak Creek and West Fork Oak Creek subbasins. Because narrow-headed gartersnakes in Oak Creek are likely important to the overall range of the species, the FWS, AGFD, USFS, and Northern Arizona University (NAU) collected 11 snakes in order to have some genetic representation of the species if the fire resulted in significant effects to the habitat and the gartersnakes. During the survey effort, we detected 42 individual gartersnakes. Although there was evidence of ash and increased sedimentation in Oak Creek and the West Fork, it was largely constrained to pools, whereas the runs and riffles in many areas appeared to be free of ash or heavy sedimentation. There were also no fish kills during the monsoon season following the fire (S. Hedwall, USFWS, personal communication. April 29, 2019) or obvious changes in captures per unit effort during annual fish surveys from May 2015 to May 2017 (Rinker and Rogers 2017). Although surveys have documented declines in this formerly robust gartersnake population over time, no significant effects to the snake's prey base or its habitat in Oak Creek appear to have resulted from the Slide Fire.

Past and Current Projects in the Action Area

Our review of past and concurrent section 7 consultations found two previous projects that occurred or are ongoing in the action area: the Oak Creek Bank Protection Project at MP 385.1 (Consultation Code 22410-2010-F-0392-R001) and the Phase II Utility and Corridor Maintenance in Arizona Forests Reinitiation (Consultation Code 22410-2006-F-0365). The objectives of the bank protection project were to repair the existing embankment and provide new bank protection, and to mitigate bank erosion caused by storm water flows and local overland flows. The reinitiation addressed potential effects from the continued implementation

of the Phase II utility (Salt River Project and Arizona Public Service) maintenance project on newly listed species and their proposed critical habitats throughout Arizona national forests, including the CNF in Oak Creek Canyon.

Our review also found one formal consultation currently in progress, the Pumphouse Wash Bridge Rehabilitation and Erosion Mitigation Project at MP 387.7 (Consultation Codes 002EAAZ00-2017-F-0562 and 002EAAZ00-2017-F-0833). The proposed bridge project upgrades structural integrity, extends its life, mitigates current erosion, and reduces downstream pollution.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

Narrow-headed Gartersnake

Direct Effects

We anticipate that direct adverse effects to gartersnakes are likely to occur from the proposed pavement preservation action. Direct adverse effects can include harassment, injuries, and fatalities of individual gartersnakes that occupy habitats near the construction footprint during project activities. These effects will depend on the timing of construction activities and the snake's seasonal activities and habits. Because gartersnake populations appear reduced within the overall action and the short project duration in any one area, we expect few gartersnakes will be adversely affected.

Gartersnakes in Oak Creek Canyon are active above ground from about March to late October or November each year and are less surface active during brumation from about December to February. The project is scheduled to occur from September 2019 to January 2020; thus, will overlap the gartersnake's active period by about 3 months and its inactive period by about 2 months.

Above baseline traffic (ADOT 2017), we anticipate gartersnakes active during the project will be adversely affected from exposure to elevated disturbance levels and vibrations associated with milling machines, pavers, other heavy equipment, pneumatic tools (e.g., jackhammers), and construction traffic. Disturbance levels during this project may trigger flight responses and avoidance behavior and increase the time gartersnakes spend under cover. Gartersnakes fleeing construction activities or taking shelter inside the construction footprint will be at risk of injuries or fatalities from vehicle strikes and heavy equipment. In October and November, gartersnake movements away from the creek and through the construction footprint may increase as snakes disperse towards off-channel brumation sites. Gartersnakes will be less likely to brumate in or

near active construction areas than in areas that are relatively disturbance free; however, individuals in areas where milling and paving have not yet occurred will be at risk of being trapped or crushed while dormant if they choose brumation sites inside the construction footprint. If the schedule of paving operations is extended, gartersnakes will be vulnerable for a longer period, and in August and September more gartersnakes will be at risk of injury or death because neonates (young-of-the year) will be active along with adult and subadult snakes.

A number of factors may help to reduce adverse effects to gartersnakes from proposed pavement activities. First, gartersnakes adversely affected by the project are likely to be lower because gartersnake numbers appear to have changed throughout the Oak Creek action area in recent years, with higher densities being a smaller proportion of the action area. Second, gartersnakes may move away from construction activities without consequence. Finally, elevated disturbance levels along any given point of the roadway will be temporary. Milling and paving machines will be moving through the construction footprint continuously, but will not remain at any one point for long; thus, displaced gartersnakes may be able to return to the areas they occupied prior to construction.

Due to the implementation of conservation measures, which include following FWS guidance (White 2007) and label requirements, we expect any effects to gartersnakes from herbicide application will be discountable. No herbicides with a toxicity rating over 0 for small avian species, reptiles, and amphibians will be used. No broadcast spraying will occur. All herbicides will be applied by hand, with a relatively coarse spray to insure direct application to plants and prevent overspray. Because the treated plants are adjacent to the roadway and fragmented from the riparian and stream area, we do not expect gartersnakes or their prey will occur within these strips or the small patches of vegetation and be exposed to herbicides.

Indirect Effects

Future population-level indirect effects due to loss of a small number of gartersnakes are difficult to predict. However, because the anticipated amount of gartersnakes which could be killed during the project (which may include neonates) is small, we expect an insignificant effect to future reproduction or population density. Population effects are dictated by survival rates, recruitment, and other demographic factors (such as predation), that in context, likely have greater influence on the population.

We anticipate an insignificant effect to gartersnakes from tree removal activities. Tree removal along SR 89A's roadway will be confined to the unpaved ROW surfaces of the action area, including the shoulders, vehicle turnouts, and recovery zones. Because the approximate 1,800 small trees ($\leq$ 4 inches in diameter) along 12 mi of open roadway are isolated and disconnected from the riparian area, these linear strips or small vegetation patches are not expected to provide gartersnake habitat, and as a result, the effect will be insignificant.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future

Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Future non-federal actions within the action area that are reasonably certain to occur include the development and/or modification of private property in-holdings through new construction, tree removal, and alteration of streamside habitat. These activities may reduce the quality and quantity of gartersnake habitat and may result in disturbance and/or injuries or fatalities. New developments may also increase sediment transport into gartersnake habitat and increase the potential for additional non-native aquatic species introductions. Residential home and commercial development on private lands will continue into the foreseeable future and will continue to adversely impact the Oak Creek watershed by increasing water use and decreasing water quality.

JEOPARDY ANALYSIS

Section 7(a)(2) of the ESA requires that federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat.

Jeopardy Analysis Framework

Our jeopardy analysis relies on the following:

"Jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02). The following analysis relies on four components: (1) Status of the Species, which evaluates the range-wide condition of the listed species addressed, the factors responsible for that condition, and the species' survival and recovery needs; (2) Environmental Baseline, which evaluates the condition of the species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the species; (3) Effects of the Action (including those from conservation measures), which determines the direct and indirect impacts of the proposed federal action and the effects of any interrelated or interdependent activities on the species; and (4) Cumulative Effects, which evaluates the effects of future, non-federal activities in the action area on the species. The jeopardy analysis in this biological opinion emphasizes the range-wide survival and recovery needs of the listed species and the role of the action area in providing for those needs. We evaluate the significance of the proposed Federal action within this context, taken together with cumulative effects, for the purpose of making the jeopardy determination.

CONCLUSION

After reviewing the current status of the gartersnake, the environmental baseline for the action area, the effects of the proposed pavement preservation project, and the cumulative effects, it is our biological opinion that construction activities along SR 89A as proposed are not likely to jeopardize the continued existence of the gartersnake.

We based our determination on the following:

- We anticipate adverse effects to individual gartersnakes will be minimized because of low snake densities in much of the action area and because the construction footprint lacks preferred gartersnake habitat and cover.
- The project is expected to adversely affect a small number of individual gartersnakes, but the small number will not result in population level effects to Oak Creek Canyon gartersnakes.
- Effects to gartersnakes and its habitat from tree removal and herbicide application is expected to be insignificant, based upon the relatively small number of trees to be removed along isolated turnouts and roadway edges and the site-specificity and low toxicity of herbicide application.

We base the conclusions of this biological opinion on full implementation of the project as described in the *Description of the Proposed Action* section of this document, including any Conservation Measures that were incorporated into the project design.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is defined (50 CFR 17.3) to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined (50 CFR 17.3) as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. "Incidental take" is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

AMOUNT OR EXTENT OF TAKE

The FWS anticipates two narrow-headed gartersnakes will be taken as a result of the proposed action. The incidental take is expected to be in the form harassment and harm (injuries or fatalities). Construction activities are anticipated to disturb, displace, and subsequently harass surface active or dormant gartersnakes, resulting in gartersnake injuries or fatalities due to vehicle strikes or crushing by heavy equipment.

The FWS anticipates incidental take of gartersnakes will be difficult to predict because we have no reliable site-specific estimates of gartersnake distribution or abundance within the Oak Creek action area, nor can we be certain of responses to disturbance by individual snakes. Gartersnakes injured or killed aboveground in the construction footprint may be found and recorded; however, gartersnakes that are injured or killed below ground are not likely to be detected. However, we expect that the number of gartersnakes taken during the proposed action will be small because Oak Creek gartersnake populations in the action area are believed to be diminished and some

gartersnakes can be expected to avoid the footprint during construction, without further adverse effects.

If two gartersnakes are found dead or injured from construction activities within the action area over the life of the project, then the amount or extent of incidental take has been reached. As provided in 50 CFR Section 402.16, consultation reinitiation would be required for any additional incidental take authorization.

EFFECT OF THE TAKE

In this biological opinion, the FWS determines that this level of anticipated take is not likely to result in jeopardy to the species for the reasons stated in the Conclusions section.

REASONABLE AND PRUDENT MEASURES

The following reasonable and prudent measure is necessary and appropriate to minimize take of the narrow-headed gartersnake:

1. ADOT shall monitor incidental take resulting from the proposed action and the occurrence of gartersnakes in the construction footprint and report to the FWS the findings of that monitoring.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, ADOT must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1.1 Details of the required monitoring program (hereafter the monitoring protocol) will be determined in cooperation with the FWS before construction begins, and will include, at a minimum, procedures to be followed in the event that encounters with live or dead gartersnakes occur inside the construction footprint. Species verification and photo documentation instructions, record keeping procedures, handling and storage of dead or injured snakes, and wildlife agency contact requirements (in addition to those outlined below) will be provided in the monitoring protocol.

1.2 ADOT shall submit a report to the Arizona Ecological Services Office (AESO) in Phoenix within 90 days of project completion. The report shall briefly document the locations of listed species observed. The report shall also summarize tasks accomplished under the conservation measures and terms and conditions. The report shall make recommendations for modifying or refining these terms and conditions to enhance listed species protection.

1.3 ADOT shall immediately report any narrow-headed gartersnake occurrence, injury, or fatality to the FWS's gartersnake lead within 24 hours of finding the snake(s). Any gartersnake occurrence, injury, or fatality detected during construction will prompt

discussion between ADOT and the FWS to assess the accuracy of the proposed action and biological opinion, and whether any further conservation measures, analysis, or re-initiation is necessary.

Review requirement: The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, the level of incidental take is exceeded, such incidental take would represent new information requiring review of the reasonable and prudent measures provided. ADOT must immediately provide an explanation of the causes of the taking and review with the AESO the need for possible modification of the reasonable and prudent measures

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Disposition of Dead or Injured Listed Species

Upon locating a dead, injured, or sick listed species initial notification must be made to the U.S. Fish and Wildlife Service, Office of Law Enforcement, (Resident Agent in Charge), 4901 Paseo del Norte NE, Suite D, Albuquerque, New Mexico, 87113, telephone: 505/248-7889, within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph if possible, and any other pertinent information. The notification will be sent to the Office of Law Enforcement, with a copy to this office. Care must be taken in handling sick or injured animals, to ensure effective treatment and care, and in handling dead specimens to preserve the biological material in the best possible state.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. We recommend that ADOT work with the FWS and CNF to reduce effects to gartersnakes by reducing opportunities for uncontrolled access to Oak Creek from SR 89A.

2. We recommend that ADOT, CNF, and AGFD, in cooperation with the FWS, seek opportunities to educate recreationists and seek their assistance in protecting the gartersnake and its habitat in Upper Oak Creek and elsewhere on the CNF. We recommend collaborative opportunities to educate CNF visitors (possibly with campground hosts, signage, maps, brochures, etc.) on gartersnake natural history, habitat, conservation, threats, and protection of Oak Creek.

3. We recommend that ADOT work with the FWS, AGFD, ADOT, Northern Arizona University, and CNF to continue monitoring gartersnakes in the Oak Creek Watershed.

In order for the FWS to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the FWS requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the action(s) outlined in the request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

We appreciate the ADOT's efforts to identify and minimize effects to listed species from this project. For further information, please contact Robert Lehman (602) 889-5950 or Greg Beatty (602) 889-5941. Please refer to the consultation number 02EAAZ00-2019-F-1164 in future correspondence concerning this project.

Sincerely,

Greg Beatty for JAH

Jeffrey A. Humphrey
Field Supervisor

cc:

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Environmental Coordinator, Bureau of Indian Affairs, Phoenix, AZ (Attn: Chip Lewis)
Yavapai Culture Director, Yavapai-Apache Nation, Camp Verde, AZ
Director, Culture Research Department, Yavapai-Prescott Indian Tribe, Prescott, AZ
Director, Cultural Resource Department, Tonto Apache Tribe, Payson, AZ
Supervisor, Traditional Cultural Program, Navajo Nation, Window Rock, AZ
Executive Director, Inter-Tribal Council of Arizona

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APPENDIX A: CONCURRENCE AND FIGURES

This appendix contains our concurrences on the threatened Mexican spotted owl and its designated critical habitat, proposed gartersnake critical habitat, and figures from ADOT's February 2019 BE.

Mexican Spotted Owl

The construction footprint includes 182 ac of the owl's 238,092-ac Upper Gila Mountains-13 (UGM-13) designated critical habitat unit (69 FR 53182). Three protected activity centers (PACs) occur near the construction footprint: Sterling PAC, Pumphouse Wash PAC, and Cave Creek PAC (Figure 2). Owls occupy all three PACs.

Owl PACs in Oak Creek Canyon do not overlap the construction footprint; however, Sterling PAC borders the rockfall mitigation site at MP 389.2. The PAC boundary is 0.17 mi (900 ft) west of the mitigation site at its nearest point. Pumphouse Wash and Cave Creek PACs are ≥0.8 mi east and south of the mitigation site. The Sterling and Cave Creek PACs are ≥0.5 mi from the northern limit of the pavement rehabilitation project at MP 386.6.

PCEs of designated owl critical habitat in steep-walled canyons include 1) presence of water; 2) clumps or stringers of mixed conifer, pine-oak, pinyon-juniper, and/or riparian vegetation; 3) canyon walls containing crevices, ledges, or caves; and 4) high percent of ground litter and woody debris.

Conservation Measures

- Before construction begins, a qualified biologist would provide environmental awareness training and a project-specific handout to all personnel who would be on-site during the project, including, but not limited to, contractors, contractors' employees, supervisors, inspectors, and subcontractors. Training would include, at a minimum, information concerning owl biology, identification, and distribution, its legal status, occurrence in the project area, measures to avoid owl impacts, and appropriate responses if owls are encountered during construction. Prior to implementation, the FWS will review the program.
- All planned actions are tentatively scheduled to occur from September 2019 to January 2020, outside the owl's breeding period (March 1-August 31). If ADOT priorities change, work could begin in August 2019 and end in June 2020. In the latter case, activities with the highest noise levels, e.g., pavement milling and repaving would not occur during the owl's breeding season (March 1 through August 31).

Determination of Effects

We concur with your determination that the proposed action may affect, but is not likely to adversely affect the owl or its designated critical habitat for the following reasons:

- Under the tentative project schedule, no construction activities would occur during the owl's breeding period (March 1-August 31); therefore, no breeding owls would be disturbed by noise generated from the proposed action.
- If construction occurs during the breeding period, noise effects to owls will be minimized by the distances from construction sites to PAC boundaries (which in most cases are ≥0.5 mi), by intervening topography that will buffer owls in their PACs from noise effects, and by conservation measures outlined above. Therefore, we expect noise effects to owls during the breeding period to be insignificant.
- ADOT plans to remove over 1,700 trees from the construction footprint. Tree removal will be restricted to small trees ≤4 inches in diameter and do not occur in areas that include nesting or roosting habitat. In addition, ADOT will not remove any trees from PACs. Loss of trees from vehicle turnouts and vehical recovery zones along SR 89A will not affect the suitability of owl recovery habitat or critical habitat outside the PACs, and therefore we expect the effect will be insignificant.

Narrow-headed Gartersnake Proposed Critical Habitat

Proposed gartersnake critical habitat in Oak Creek Canyon is part of the 7,369-ac Oak Creek Subunit which encompasses 51.3 stream mi of Oak Creek (78 FR 41550), including 12.1 mi and 175 ac of the 200-ac construction footprint. Primary constituent elements (PCEs) of proposed critical habitat for the gartersnake include: 1) stream habitat; 2) adequate terrestrial space (600 ft lateral extent to either side of bankfull stage) with sufficient structural characteristics to support life-history functions; 3) a prey base consisting of viable populations of native fish species or soft-rayed, nonnative fish species; and 4) absence or low occurrence of nonnative fish species of the families Centrarchidae and Ictaluridae, bullfrogs (*Lithobates catesbeianus*), and/or crayfish (*Orconectes virilis, Procambarus clarki*).

Conservation Measures

- No construction or ground-disturbing activities shall begin until a qualified biologist has presented an environmental gartersnake awareness program to all personnel that will be on site, including but not limited to contactors, contractor's employees, supervisors, inspectors, and subcontractors working in the construction footprint. The program will contain, at a minimum, gartersnake identification, biology and its distribution, legal status, occurrence in the action area, and implementing procedures if gartersnake encounters occur (photographs, record keeping, species verification, handling/storage of dead or injured snakes, and wildlife agency contact information). Prior to implementation, the Service will review the program.

Determination of Effects

We concur with your determination that the proposed action may affect, but is not likely to adversely affect proposed gartersnake critical habitat for the following reasons:

- The pavement rehabilitation project from MP 374.5 to MP 386.6 will require no water diversions or instream work; thus, will not directly affect PCEs 1, 3, or 4 (stream habitat, prey base, or absence of nonnative species).

- Removal of small trees along SR 89A recovery zones, shoulders, and turnouts are comprised of disconnected and isolated vegetation from the riparian area and gartersnake habitat, and as a result, will have an insignificant effect to PCE 2.
- Herbicide application will follow all FWS and label guidelines and be hand applied directly to vegetation, preventing any distribution into areas where gartersnake or gartersnake habitat contamination could occur (PCE 1).

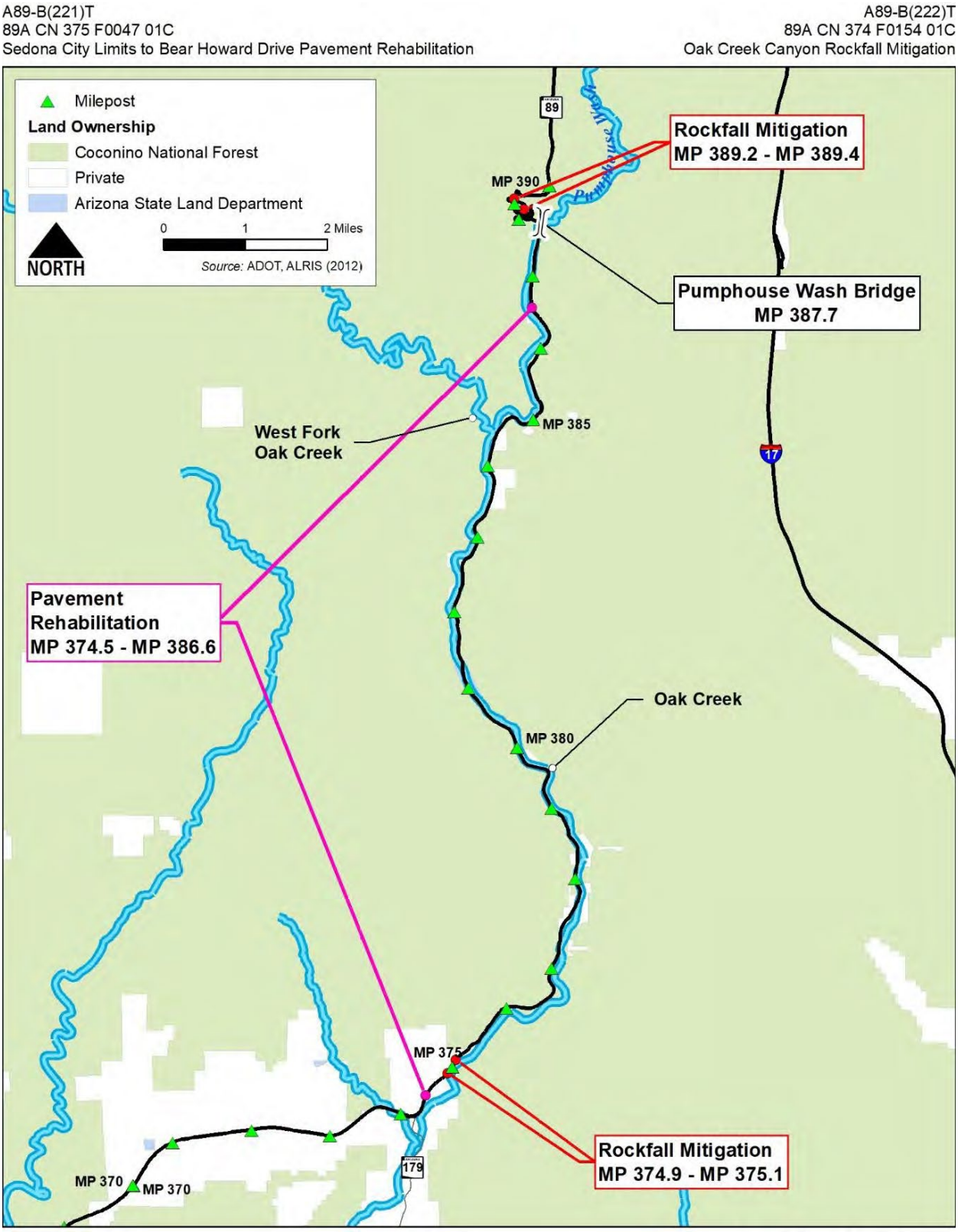

Figure 2 – Vicinity Map

Figure 1. Vicinity map showing landownership and the start and end points of the pavement preservation project and locations of two rockfall mitigation sites.

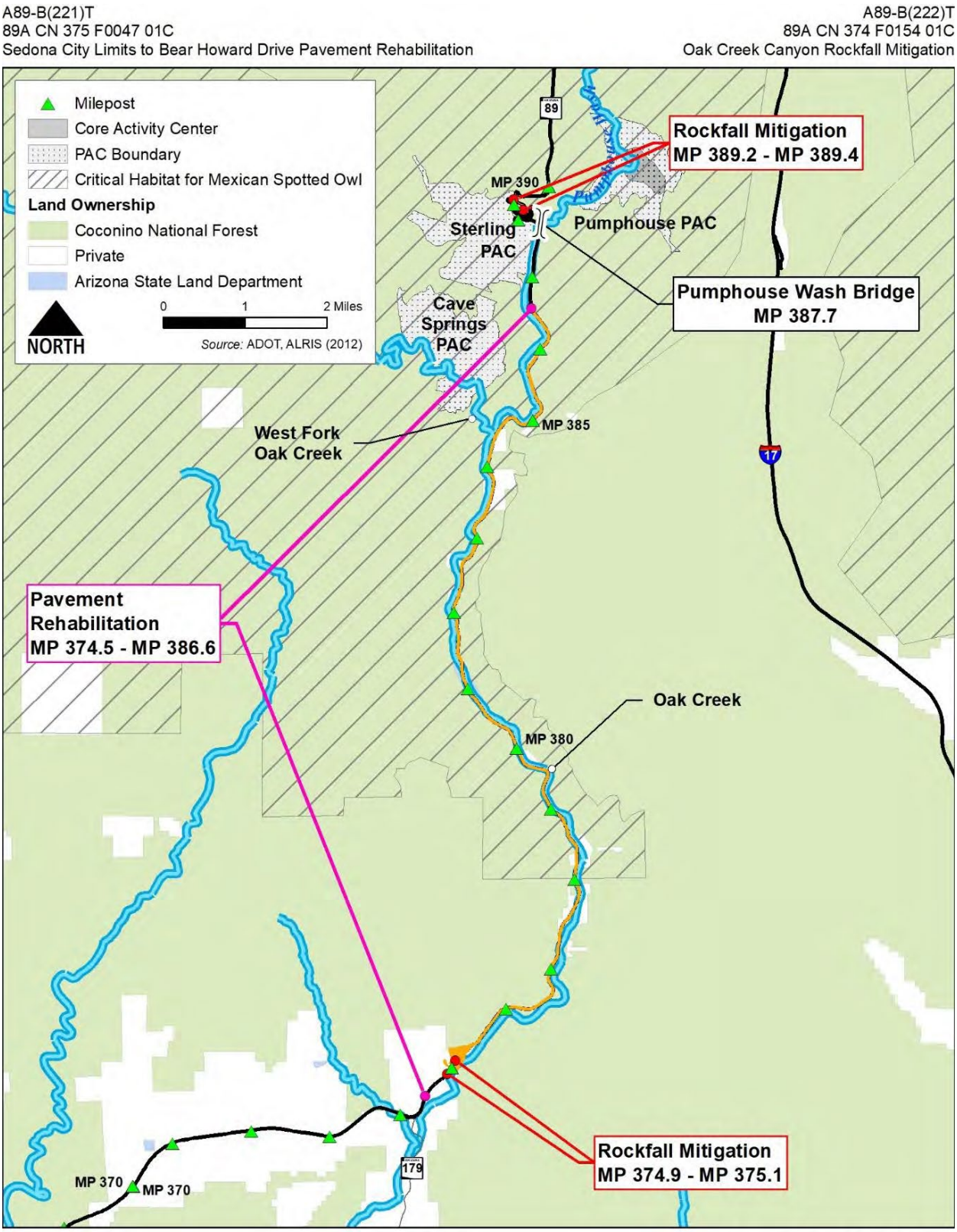

Figure 3 – Vicinity Map

Figure 2. Mexican spotted owl designated critical habitat and owl protected activity centers (PACs) overlaid on the project vicinity map shown in Figure 1.